

WHAT IS CLAIMED IS:

1. A damping-force variable shock absorber comprising:

a cylinder having an inner wall;

a piston rod having a proximal end and a distal end, the piston rod being

5 mounted inside said cylinder and configured for linear movement relative to said cylinder;

an orifice valve plate having a plurality of valve holes, the orifice valve plate being configured and mounted about said piston rod such that said plurality of valve holes form a circle about said piston rod;

10 a rotary valve plate having a plurality of radially-protruding projections, said rotary valve plate being mounted about said piston rod so as to be rotatable with respect to said piston rod and said orifice valve plate, said rotary valve plate having a first rotating state with respect to said orifice valve plate such that said plurality of valve holes define a first opening, said rotary valve plate having at least a second rotating state
15 with respect to said orifice valve plate such that said plurality of holes define at least a second opening different from the first opening; and

a guide means for rotating said rotary valve plate between said first rotating state and said at least second rotating state relative to said orifice valve plate, the guide means being between said rotary valve plate and said cylinder.

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2. The shock absorber as defined in claim 1, wherein the piston rod is secured to a vehicle body, the shock absorber further comprising a rotation restriction means for restricting rotary movement of said piston rod relative to said vehicle body, said rotation restriction means being mounted between said piston rod and said vehicle body.

3. The shock absorber as defined in claim 2, wherein at least a portion of said piston rod defines a circular cross-section and said rotary restriction means comprises a key contact surface formed at the distal end of said piston rod.

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4. The shock absorber as defined in claim 1, wherein each of said plurality of valve holes are substantially elongated and circularly arc-shaped, said plurality of valve holes being arranged at a substantially equal interval along a circle about said piston rod.

10 5. The shock absorber as defined in claim 1, wherein said projections of said rotary valve plate are arranged at a substantially equal interval along a circle about said piston rod, said projections being substantially fan-shaped.

6. The shock absorber as defined in claim 1, further comprising a bearing
15 interposed between said rotary valve plate and said piston rod, and a snap ring engaged with said piston rod for preventing the linear movement of said rotary valve plate along said piston rod.

7. The shock absorber as defined in claim 1, wherein said guide means comprises:
20 a tip formed on at least one of said projections of said rotary valve plate; and a plurality of guide grooves formed at said inner wall of said cylinder, wherein further said tip is engaged with at least one of said guide grooves.

8. The shock absorber as defined in claim 7, wherein said plurality of guide

grooves have at least one straight section formed in parallel along a longitudinal direction of said cylinder and at least one curved section formed along a longitudinal direction of said cylinder.

- 5 9. The shock absorber as defined in claim 7, wherein said guide grooves comprise:
a first straight section formed in parallel along a longitudinal direction of said cylinder and at a longitudinal midsection of said cylinder;
an incline section formed along and inclined relative to the longitudinal direction of said cylinder, said incline section vertically extending under and above
10 relative to said first straight section; and
a second straight section formed in parallel along the longitudinal direction of said cylinder, said second straight section extending under and above relative to said incline section.

- 15 10. The shock absorber as defined in claim 1, wherein said orifice valve plate includes a ring-shaped cushion part made of cushioning material, said cushion part extending distally.

11. A damping-force variable shock absorber comprising:
20 a cylinder defining a longitudinal axis and having an inner wall, said inner wall including at least one groove extending longitudinally;
a piston rod having a proximal end and a distal end, the piston rod being mounted inside said cylinder and configured for linear and rotational movement relative to said cylinder;

an orifice valve plate having at least one valve hole, the orifice valve plate being mounted about said piston rod;

a rotary valve plate having at least one radially-protruding projection engaged with said groove, said rotary valve plate being mounted about said piston rod so as to be rotatable with respect to said piston rod and said orifice valve plate, said rotary valve plate having a first rotating state with respect to said orifice valve plate such that said at least one valve hole defines a first opening, said rotary valve plate having at least a second rotating state with respect to said orifice valve plate such that said at least one valve hole defines at least a second opening different from the first opening; and

wherein said engagement of said projection with at least a portion of said groove causes rotation of said rotary valve plate from said first rotating state to said at least second rotating state relative to said orifice valve plate.

12. The damping-force variable shock absorber of claim 11, wherein the second opening is smaller than the first opening.